Sound and Music Interventions in Psychiatry at Aalborg University Hospital

Lund, Helle Nystrup; Bertelsen, Lars Rye; Bonde, Lars Ole

Published in:
SoundEffect

Publication date:
2016

Document Version
Publisher's PDF, also known as Version of record

SoundEffects
An Interdisciplinary Journal of Sound and Sound Experience

Helle Nystrup Lund, Lars Rye Bertelsen and Lars Ole Bonde

Sound and music interventions in psychiatry at Aalborg University Hospital

Helle Nystrup Lund
Clinical Music Therapist
Aalborg University Hospital (AUH)
Psychiatry

Lars Rye Bertelsen
The Music Therapy Clinic
Aalborg University Hospital (AUH)
Psychiatry and Aalborg University

Lars Ole Bonde
The Music Therapy Clinic
Aalborg University Hospital (AUH)
Psychiatry and Aalborg University

www.soundeffects.dk

SoundEffects | vol. 6 | no. 1 | 2016 issn 1904-500X

Abstract

This article reports on the ongoing project development and research study 'A New Sound and Music Milieu at Aalborg University Hospital'. Based on a number of pilot studies in AUH-Psychiatry on how special playlists and sound equipment (sound pillows and portable players) can be used by hospital patients and administered by hospital staff supervised by music therapists, the new project aims to prepare the ground for a systematic application of sound and music in the hospital environment. A number of playlists have been developed, based on theoretical and empirical research in music medicine and music therapy. A special software and hardware design – 'The Music Star'– has been developed, and installed in combination with a directional line array speaker in patient rooms in two ICUs at the AUH–Psychiatry. The aim of the project is to empower patients to choose music suited to their needs here and now. In the study we focus on how self-selected music may lead to a decrease in anxiety and pain or improved relaxation/sleep. The article describes and discusses the theory-driven development of the sound/music milieu, relevant empirical studies, the novel method of data collection, preliminary results of the project and implications for the future implementation of the model.

Introduction

Music can be used to regulate mood and arousal, to relax, to manage pain (Chanda & Levitin, 2013; Gebauer & Vuust, 2014) and to prevent insomnia (Jespersen et al., 2015). As research into music intervention in clinical settings is emerging in peer-reviewed articles and meta-reviews, music intervention (a concept covering music therapy as well as music medicine) takes important steps towards recognition as evidence-based practice. For more than 10 years music listening has been an option for patients receiving music therapy during their hospitalisation at Aalborg University Hospital. This clinical practice in the psychiatric units has developed over the years, starting when music listening existed mostly as a part of individual and group treatment by music therapists (Lund, 2008; Lund & Fønsbo, 2011). From 2009 to 2011 several pilot projects have been conducted offering music listening to individual patients in different psychiatric settings at Aalborg University Hospital (Bonde, 2009; Schou, Bonde & Pedersen, 2011), and the documented outcome has subsequently been published. A recent project was derived from the national project 'Reduction of Restraint in Psychiatry' initiated by the Danish National Board of Health from 2011 to 2014. The aim of this project was to offer music pillows (pillows with small built-in speakers) and special music programmes as a non-medical alternative to tranquilising medicine in all psychiatric adult in-patient units at Aalborg University Hospital (Hannibal, Bonde & Lund, 2013).

In recent years more projects have been initiated involving nurses, who facilitate the music listening procedure (Hannibal, Bonde & Lund, 2013). These initiatives

issn 1904-500X

were from the beginning related to the national campaign for reduction of restraint in psychiatry mentioned above. The nurses involved have gained clinical experience in offering music to patients resulting in new practices where music listening is considered an effective coping strategy to regulate affect, to reduce stress and anxiety, and it is now used alongside other clinical interventions.

Music milieu

In the North Denmark Region there has been a number of projects focussing on improvements of sound environments in healthcare. The aim has been to introduce music and sound environments as a complementary therapeutic tool in medicine. A medical doctor (an expert in anaesthesia and intensive care), Thorgaard, has been involved in pioneering work implementing sound environments and music in the hospital and prehospital environment. Thorgaard implemented music listening with the Maysound Music Player (a special product for hospitals) for patients in the postanaesthesia care unit (Thorgaard et al., 2005). He also introduced music as part of the treatment procedure in all ambulances in the North Denmark Region. This innovative idea to reduce stress in patients in ambulances was awarded 'Idea of the year' at the 2015 Danish Music Awards, and as of 1 February 2016 all new ambulances, including in the Capital Region of Denmark, will offer music to patients. This work has highlighted particular challenges for music listening in the ICU. There are technical requirements concerning safety, infectious control, easy access and 'neutral' installation as well as requirements concerning regulation of the volume of the music adjusted to the noise level of the ambulance siren and other sounds in and around the ambulance.

Music equipment

The music listening practice at AUH has been shaped by different technical ideas and solutions. Over the years CD players and portable 'ghetto blasters' have been replaced by iPads and computers with portable speakers. Maysound Music Players are now used alongside music pillows and MP3 players. A hard pillow speaker with a Bluetooth connection to the patient's own music player has also been used (created by the inventor Finn Toklum Kofoed, primarily for patients with dementia). At the present a newly developed sound system and 'The Music Star' software are implemented as a permanent installation in patient rooms, adding a new generation of technical solutions to the distribution of sound and music in hospitals.

Music selection

The selection of music has been subject to change over the years – from pieces of music provided by the music therapist to individual patient-selected music in both individual music therapy and in music listening groups. Selections by music ther-

issn 1904-500X

apists are most often made with a known individual or group of people in mind (Lund, 2011; Lund & Fønsbo, 2011). The present music listening projects offer a standardised set of playlists with a specially designed music player. The playlists and 'The Music Star' are described in detail later in this article. All playlists have been developed by music therapists.

Empowerment of the patient

A scene from the ICU in psychiatry: A middle-aged male patient is sitting on his bed with a distressed look on his face restlessly moving his hands and legs. He looks up at the nurse and says, 'I am falling apart. Everything I have tried to do to keep myself together has failed. It's all hopeless. And now you suggest that I listen to a piece of music?'

This patient comment points out several important points. Firstly, music is not a miracle cure and not beneficial to all. Secondly, music listening may offer a much needed break from worries, suicidal thoughts, from hearing voices and from feelings of pain (Hanser & Mandel, 2010; Hannibal, Bonde & Lund, 2013). And finally, for a group of patients in acute crisis to use music as a helpful intervention and to understand how it may help, they require guidance and information. (This third statement is based on 10 years of clinical practice in the ICU at Aalborg University Hospital – Psychiatry).

The comment above demonstrates a common patient perspective after admission to a psychiatric ICU. Disregarding individual problems and diagnostic differences, patients share feelings of chaos and hopelessness, and this is often accompanied by negative expectations towards treatment. Since music listening is widely known as an activity associated with pleasure (Miell, MacDonald & Hargreaves, 2005) and not considered a treatment, the patient is more likely to respond positively to music listening and to regard it as a harmless and acceptable pastime activity while waiting for recovery. This is well in line with the neuropsychological fact that music can by-pass cognitive appraisal to be processed by the amygdala in almost direct emotional processing (Chanda & Levitin, 2013). Nevertheless, the positive attitude can be an offset to help the patient make a first constructive choice at a time when many personal choices have been destructive. At this time of the hospitalisation the patient's coping strategies often encompass substantial negative side effects overshadowing the original intention. Besides, hospitalisation takes the individual away from daily routines and activities leaving him or her in a passive position that is not helpful for the recovery process. Today, the focus on patient-centred treatment and the importance of helping the patient take responsibility for and control over his or her own treatment and recovery is not only part of the national political agenda, but also a part of multidisciplinary clinical practice in psychiatry. When improving the music equipment and facilitating music listening in a hospital setting it is

issn 1904-500X

important to consider the patients' wish to be in control and to make choices concerning their personal health and treatment. The aim is to empower patients to choose music suited to their needs and preferences, counteracting the general tendency to pacify patients in the hospital milieu.

A systematic review on 'The effectiveness of music listening in reducing depressive symptoms in adults' (Chan, Wong & Thayala, 2011) concludes that all types of music can be used depending on individual preference. The most important factor considering the effect of music listening is that individual choice of music is possible from an available music collection. The review also suggests that the effect of music listening augments with an increasing number of music listening sessions.

Pilot projects, literature review and theoretical background

The new project aims to prepare the ground for a systematic application of sound and music in the hospital environment. It is firmly based on a number of pilot studies conducted in AUH-Psychiatry over the last seven years, as described shortly in the introduction, and on reviews of the literature. Hannibal, Lund & Bonde have investigated how special playlists and special sound equipment (sound pillows and portable players) can be implemented in daily routine care, i.e. how these tools can be used by hospital patients and administered by hospital staff supervised by music therapists. A number of special playlists have been developed, based on theoretical and empirical research in music medicine and music therapy, and different types of sound equipment have been tested (Bonde, Hannibal & Pedersen, 2012; Hannibal, Bonde & Lund, 2013; Schou & Bonde, 2012; Schou, Bonde & Pedersen, 2011; Lund, Bertelsen, 2016). Schou (2007) investigated if a particular music therapy intervention – Guided Relaxation with Music – could help patients in a coronary unit (at Aalborg University Hospital) relax, alleviate pain and reduce anxiety before and after heart surgery. She developed a guiding manual, and the guiding was accompanied by 30 minutes of music chosen by the patients from one of four playlists developed by the researcher. The four playlists were named according to style: Classical, Easy Listening, MusiCure and Jazz, and the patients made their individual choices after listening to short (30 seconds) excerpts of each programme. There was a clear pattern in patient preferences: Half of them chose Easy Listening, the other half was divided between Classical and MusiCure, while no one chose the Jazz programme. In the literature there is a long discussion about expert-selected versus patient-selected music (Short & Ahern, 2009; Bonde, 2009), and in Denmark a number of music medicine studies have been made with the specially composed MusiCure series as the only music offered. Schou's study demonstrated that only a minority of the patients chose MusiCure if alternatives were offered. This supports the claim made in many

issn 1904-500X

studies that patients' preferred music is more effective than expert-selected or specially composed music only (Chan, Wong & Thayala, 2011).

When Schou joined the team at the Music Therapy Clinic at AUH, the active guiding part/script was omitted (it did not fit into the routines of the psychiatric ICUs), and the team concentrated on developing a music medicine intervention based on the principle that the intervention should be manageable for the often frail and anxious patients, with minimal help from the staff. The three favourite music programmes from Schou's original study were preserved and further developed, and new programmes were introduced: Rock for Relaxation and Nature Sounds (without music) (Hannibal, Bonde & Lund, 2013). The Nature Sounds programme was later discarded because no patients wanted it. A possible explanation is that the authentic recording of nightingales and other birds in the Danish summer night were too challenging, too different from the patients' situation at the hospital and may have reminded them of soundscapes they felt were lost to them. When music pillows including a selection of playlists on MP3 players were made available at all psychiatric in-patient units in the hospital in 2012, the playlists were revised considering the gained experience and new wishes based on: a) music requests from patients and staff, b) music requests from the clinical music therapists according to their needs in daily practice, and c) the intention to limit the selection of music available in order to make it manageable also for patients with cognitive impairments and to secure simplicity in helping the nurses guide the disturbed patients to make a choice of music. A major challenge was therefore to balance the wish for a broader musical repertoire acknowledging the variety of individual preferences with the wish for functional simplicity and clarity.

We also tested different types of audio equipment, especially the Maysound Music Player and different types of music pillows. The music was played on different types of MP3 players connected to the pillow through a cord. The length of the cord was a difficult issue; it had to be short so that patients could not use it for self-mutilation/suicide attempts (Hannibal, Bonde & Lund, 2013). The system was implemented in a number of wards, and five interviews with core staff members from the involved wards documented their experiences and were subjected to thematic analysis (Braun & Clarke, 2006). The following themes were identified:

1. FEASIBILITY. Music pillows were used in all wards with positive results, including reduction of analgesia for some patients. The intervention was also used with psychotic patients, however with special attention to the selection of music programmes.
2. VARIED USE. The use of music pillows varied in intensity and frequency across the wards due to (a) patients' diagnoses and needs, (b) staff member's experienced skills with the intervention and (c) patients' age and musical preferences.

issn 1904-500X

3. THREE MAIN AIMS. The music pillows were most often used to assist frail or feeble patients and for specific purposes: (a) distraction (e.g. from hearing voices, rumination or suicidal thoughts), (b) relaxation, stress relief and well-being, and (c) mild support in fighting insomnia and improving patients' sleep.
4. TECHNICAL DIFFICULTIES. Staff members reported a number of challenges in handling the equipment, for instance difficulties in operating the MP3 player and lack of knowledge of the music programmes available.
5. THE MUSIC THERAPISTS ARE THE EXPERTS. The special knowledge of the music therapist in connection with the development of the intervention (music and equipment) and instructing the staff is crucial for the music medicine intervention to be a success.

In other words, this music intervention can be implemented as part of the 'palette of tools' used by the staff in psychiatric hospitals. However, it requires expert instruction of the staff and continuous supervision by music therapists.

Four short and six longer playlists were developed by Schou and colleagues (Schou, Bonde & Pedersen, 2011), all in a well-defined style, with a combination of musical parameters characterised as relaxing and supportive (Grocke & Wigram, 2007; Wärja & Bonde, 2014) and with the potential of lowering arousal.

Short playlists (30 minutes)	Long playlists (60 minutes)
Easy Listening (K. Norge, M. Rowland) Classical (mixed repertoire) MusiCure (N. Eje) Rock for relaxation (mixed repertoire)	Easy Listening (K. Norge) Classical (Bach, Beethoven, Mozart, Vivaldi, Chopin) Pop (J. Johnson) Relaxation ('Quiet Please') Celtic folk music (The Kells) Soul (S. Indrio, H. Gurevitsch)

Table 1. Overview of playlist from the first stage of the project

Various considerations have guided the compilation of music. From a psychological and ethical point of view, the music therapist wants the listener-patient to be able to find music that is appropriate and acceptable in his or her situation. Therefore, the programmes include a variety of relevant styles, including classical music, rock, pop, folk music, music for relaxation and MusiCure. Most of the selections are performed instrumentally in arrangements perceived as easily accessible. From a music psychological point of view, styles like contemporary classical music, jazz and hard rock are considered inappropriate, because most patients will experience the music as unfamiliar, surprising and therefore likely to increase arousal – which is counterproductive when the patient is anxious or depressed and needs relaxation.

issn 1904-500X

The taxonomy by Wärja & Bonde (2014) has guided the recent development of the playlists. The taxonomy contains three distinctive types of music: (a) Supportive music, (b) Mixed supportive/challenging music and (c) Challenging music. Each type is divided into three subtypes with increasing complexity and intensity. In our latest system of playlists – 'The Music Star' described in more detail below – only 'Supportive music' and its three subcategories: 'The supportive and safe field', 'The supportive and opening field', 'The supportive and exploring field', are used. In these categories or 'fields', independent of musical style or genre, there are no sudden or major musical surprises. The tempo is steady, often slow to medium, the rhythm is regular, and the melodic and harmonic progression is clear and predictable. There is a 'touch of the well-known', even if the music is new to the patient. The purpose of the music in these fields is to allow for surrender and comfort and, metaphorically speaking, to enable the listener to 'give in to the musical embrace'. Several meta-reviews support that music intervention (in most cases from music medicine studies) has the potential of alleviating pain and decreasing anxiety, in adult patients as well as in children (Dileo & Bradt, 2005; Nilsson, 2008; Bradt, Dileo & Shim, 2013; Hole et al., 2015) as well as somatic patients. Bradt, Dileo & Shim (2013) concluded in their review of 24 music medicine studies that music listening may have a beneficial effect on preoperative anxiety, and that music interventions may provide a viable alternative to sedatives and anti-anxiety drugs for reducing preoperative anxiety. Hole et al. (2015) reviewed 73 RCTs (n = between 20 and 458) and concluded that music listening reduced postoperative pain, anxiety and use of analgesia and increased patient satisfaction, while not affecting length of stay. So far, there are no similar meta-reviews of music intervention in psychiatry, but there is reason to believe that the same effect could to some degree also be found here.

In a broader context the music interventions described here can be seen as specific forms of 'Health Musicking' (Stige, 2003; Bonde, 2011; Ekholm, Bonde & Juel, 2015). Music medicine, music therapy and music milieu are all practices that use music to create supportive, corrective and even transformative experiences, although each has a different focus, as shown in Figure 1.

issn 1904-500X

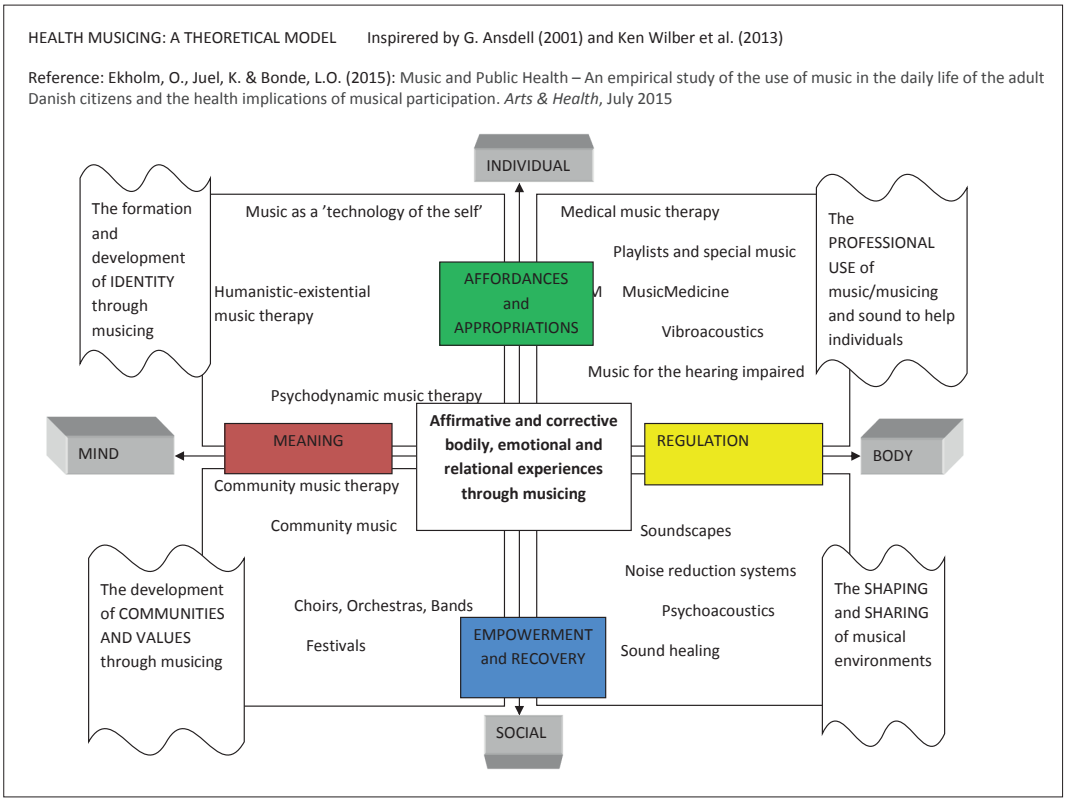

Figure 1. Health musicking. A quadrant model.

Clarke, DeNora and Vuoskoski (2015) contribute to a theoretical understanding of the 'power of music listening', namely by proposing answers to the question of how music has a capacity not only to support individual wellbeing and comfort, but also to promote empathy and social/cultural understanding through complex affective and cognitive processes involved in empathic music listening. They present a theoretical model integrating knowledge from experimental music psychology and neuromusicology.

Method

'The Music Star'

The music application that was originally offered to the project had 16 identical green buttons, one for each playlist, and additional buttons for operating the device. It also contained explanatory texts, one for each button. We were afraid that this amount of information would be too much for our patients in the ICUs to handle, and that the sound systems therefore would rarely be used. Hence, the application 'The Music Star' was developed for quick, easy and intuitive use by both patients

issn 1904-500X

and staff. The app was designed for the iPad and intended to be a self-explanatory user interface from which the user/patient can choose and play music in patient rooms and in common hallway areas. Although the iPads were originally designed to access the Internet, we have chosen to disable the Wi-Fi, tethering and Bluetooth options due to our focus on developing a valid tool for music intervention only.

Mock-up test

Before encoding the app, an extensive line of 'mock-up' tests were carried out under the supervision of Lund and Bertelsen. A mock-up test is a very easy and cheap way of introducing the design and testing whether it meets the given requirements. The tests were undertaken among selected staff and patients (10 in total) from the two ICUs, and they were video recorded for later analysis and transcription. The participants were presented with a 'Music Star' dummy containing a picture of the intended design and were asked to demonstrate how they would use the app with no instructions at all. They were asked to share their thoughts and intentions in the process, saying aloud, 'Now I want to start the music, therefore I press play', 'Now I want to increase the volume, so I use the slider' and so on. A music therapist would then activate the choices of the participants on a second hidden iPad, creating the illusion that the participants were in fact handling the device and controlling the music. As we wanted to learn whether the design was adequately self-explanatory, and to examine possible flaws, we did not inform the participants about the background and use of the app until after the test. The result of these mock-up tests clearly showed that the app was as self-explanatory and easy to use as we had hoped it would be. However, one important flaw was identified: All corners of the triangles were rounded, and this resulted in what a psychotic patient might interpret as the eye of a chameleon in the centre of 'The Music Star'. Hence, we had to adjust the design, making the ends of the triangles in the centre more pointy.

Design

As the name indicates, the design is shaped as a star consisting of 16 triangles in two circles – one inner and one outer circle, each composed of eight triangles (Figure 2). Each triangle represents a playlist, i.e. a compilation of music of between 30 to 65 minutes' duration, and to select a playlist the user simply touches the desired triangle, and as the music starts to play a white dot indicates the active playlist. If the user wants to listen to a different piece of music, it is also possible to use the traditional buttons 'Previous', 'Play', 'Pause' and 'Next' to scroll down to the next piece of music in the playlist or to shift to another playlist, until the music fits the needs and taste of the user. It is also possible to increase or decrease the volume, and moreover 'The Music Star' offers an overview of the duration of the playlist and the

issn 1904-500X

piece of music that is being played – both graphically (as a pinstripe) and in minutes and seconds.

The names of the playlists are inspired by the general theme or intended feeling produced by the playlist or by the music titles, for instance 'Together'. The name of the playlist is visible for as long as the list is active, along with the title of the piece of music being played, for instance "Beautiful Scenery" (Figure 2), and information about the artist and/or composer.

It was evident from the mock-up tests and from our experience with installing the app in the wards that the patients very quickly learn how to use 'The Music Star', and the subsequent reports we get reveal that it is easy for the patients to remember their favourite playlists, probably due to the colouring of the triangles. Furthermore, we teach the staff about the theoretical background, the intentions of use and how to present the sound system and 'The Music Star' to the patients.

'The Music Star' – wall-mounted display

The colours of the triangles fall into groups of four, with triangles in shades of blue, green, red and grey. Together the first 12 triangles can be seen as one continuum of music stimuli, starting with the least demanding stimuli in the first light blue triangle and increasing gradually to the most demanding stimuli in the last triangle in the red group. Playlists for special use can be assigned to the group of grey triangles at the bottom of 'The Music Star', for instance playlists for use in ambulances or in ECT treatment.

Figure 2. 'The Music Star'.

The playlists

A priority in developing the playlists has been to ensure a flexible use of 'The Music Star'. The aim is for the patient to consider the music a 'friend' accompanying him or her through the hospital stay. The means to accomplish this is to include both general playlists common to all wards and units and special playlists for specific needs, for instance in ambulances, emergency rooms or ECT treatment. This would give patients and staff a well-known tool regardless of ward or unit, and thus enable the patient to develop coping strategies during hospitalisation, which the patient may continue to use at home after being discharged: 'Can't sleep again – maybe I should try listening to the blue playlist; that has helped me before'.

issn 1904-500X

A core principle for the blue, green and red playlists is the classification of the music not by styles or audience, but by the degree of complexity and tension of the musical stimulus – inspired by the taxonomy by Wärja and Bonde (2014). Playlists originally developed for an earlier research project were included, and new playlists were compiled and added, as were new, specially composed music. Examples of playlist titles are 'Resting Place', 'Light Moods' and 'Mellow'. Some contain music by one composer only (e.g. 'MusiCure' by Niels Eje, 'Zen Spaces' by Kristian Thorsager), while others consist of a combination of folk, pop, rock and classical music to fit the overall idea of the taxonomy.

Whereas the general playlists (blue, green and red triangles) are common to all 'Music Stars' in ambulances, emergency rooms, wards and patient rooms, the fourth group of triangles in shades of grey is reserved for special playlists assigned to particular projects, for instance special playlists for ambulances or ECT treatment, as mentioned earlier. Those playlists could also consist of sounds of nature, for instance our first non-music playlist named 'Summer Rain' lasting approximately one hour and consisting of different recordings of the sound of rain compiled in a quasi-narrative way with a number of variations throughout. We developed this track especially for common hallway areas, and the idea is to catch the attention of restless patients ambulating up and down the hallways, providing the necessary stimuli to help the patients to regain focus, attenuate anxiety or merely experience personal calmness. We are currently preparing similar playlists, including 'Sunset by the Sea' and 'Spring Morning in the Forest'.

A total of 13 revised playlists are now available in 'The Music Star'. The development of the new playlists including criteria for the music selection and considerations in the creation of the sound track 'Summer Rain' has been described and published recently (Lund & Bertelsen, 2016).

The sound system

When introducing sound systems into psychiatric ICUs many safety requirements must be met; the hardware has to be safe and secure, it has to be robust and durable, and it has to have an appealing design for the patients to actually notice it in what is most often a stressful time, and to also encourage actual use.

In the patient room 'The Music Star' is securely installed in a locked aluminium chassis mounted on the wall, and the cords providing constant power for the iPad and connecting it to the loudspeaker embedded in the ceiling are hidden in the wall and ceiling. Hence, no cords are visible and available for self-harm.

The loudspeaker unit itself consists of a number of identical small high-end loudspeakers mounted in a line and fed in phase (line array), facilitating the production of sound with a narrower dispersion pattern. This makes it possible to limit the sound emission in one direction and to spread it in the opposite direction. Thus,

issn 1904-500X

line arrays can be oriented in any direction to obtain the desired focus of the sound. Furthermore, signal processing makes it possible to control the dynamics as well as to provide the basis for practically desired sensible limit controls.

In the patient room the speaker unit embedded in the ceiling is placed over the bed. This allows the patient to listen to music at any time he or she wants to during the day or night; another reason for this arrangement is that the bed is often used when physical restraint is required.

Being able to focus the sound has another advantage: The patient can listen to the music at a lower volume without disturbing his or her fellow patients.

Unfortunately, due to limited funding, not all patient rooms have been fitted with a sound system, meaning that not all patients have access to 'The Music Star'. This sometimes results in the staff moving patients around to ensure access for some re-admitted patients they know from experience benefit from the sound system.

Introducing the sound system to the patient

When admitted to the unit patients are introduced to the facilities in the unit and the patient room; this introduction may vary according to the mental state of the patient. 'The Music Star' is available in selected patient rooms and can be used at any time by the patient or by a nurse. The verbal instructions given for use of 'The Music Star' are very simple and most often come with a simultaneous practical demonstration: 'Would you like to listen to some music?' 'Perhaps music can help you relax/fall asleep/take a break?' 'The blue and green programmes are very quiet and relaxing'. Nurses may introduce patients to specific playlists, but the intention is to let the patients listen and select the music of their preference, acknowledging the importance of individual choice, as described earlier. The colour code association to level of stimuli is primarily intended as a tool for the nurses in assessing the needs of the patient. This information is known to the nurses and may be passed on to the patients.

The log function of 'The Music Star'

'The Music Star' has a very detailed built-in log function that registers every single event when using the app. These logs can be extracted as a CSV file (comma-separated values) and inserted into a spreadsheet or a statistical programme to analyse the data. Every time the app is touched, an 'event line' is created in the log. This line contains information about: the time (local and GMT), the event (e.g. 'AppStart', 'Play'), which buttons are pressed (e.g. 'Key A1'), the artist, title duration, play head, volume and ListName. It also includes a ListDigest that contains a checksum for the line – helpful in the event that the app is tampered with. A mere change in volume creates a new line, and thus the log file can contain a large number of lines like the

issn 1904-500X

above by the minute. See Figure 3 below. Needless to say, this data has to undergo heavy filtering for it to be useful in analysing and extracting statistics.

Filtering the log file allows us to further study the details of the usage, and in combination with statements from questionnaires and interviews with staff and patients we will be able to determine whether the app is helpful to the patients as well as to advocate for fewer or more systems to be applied at the hospital. This insight will also be taken into consideration when the existing playlists are adjusted and new ones are developed.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	GMTOffs	LocalTime	Event	Key	KeyDisplayNam	Index	Artist	Title	Duration[s	Playhead[s	Volume[dB]	ListName	ListDigest
2123	'+0200	08-09-2015 21:48	ListEnd	A1	Light Moods	9	Light Moods	09 Flutesolo from Scar	239	239	0	_FP_psyk.A1	58e7581f76e14e9885ee3d94cb0bdbfa695f8a68
2124	'+0200	08-09-2015 21:48	Play	A2	Mellow	1	Mellow	Capitol suite (Pieds en l	143	0	0	_FP_psyk.A2	3bce4bb3faade8e8b3d072861165ed0e63c90ae3
2125	'+0200	08-09-2015 21:48	ListSelect	A2	Mellow	1	Mellow	Capitol suite (Pieds en l	143	19	0	_FP_psyk.A2	3bce4bb3faade8e8b3d072861165ed0e63c90ae3
2126	'+0200	08-09-2015 21:48	Play	B1	Together	1	Together	Beautiful Scenery	186	0	0	_FP_psyk.B1	5d2fc58b7721ef4b059dac57c6528bad80bfa127
2127	'+0200	08-09-2015 21:49	ListSelect	B1	Together	1	Together	Beautiful Scenery	186	36	0	_FP_psyk.B1	5d2fc58b7721ef4b059dac57c6528bad80bfa127
2128	'+0200	08-09-2015 21:49	Play	A1	Light Moods	1	Light Moods	01 Gymnopedie no. 1, l	186	0	0	_FP_psyk.A1	58e7581f76e14e9885ee3d94cb0bdbfa695f8a68
2129	'+0200	08-09-2015 21:49	ListSelect	A1	Light Moods	1	Light Moods	01 Gymnopedie no. 1, l	186	4	0	_FP_psyk.A1	58e7581f76e14e9885ee3d94cb0bdbfa695f8a68
2130	'+0200	08-09-2015 21:49	Play	B1	Together	1	Together	Beautiful Scenery	186	0	0	_FP_psyk.B1	5d2fc58b7721ef4b059dac57c6528bad80bfa127
2131	'+0200	08-09-2015 21:49	ListSelect	B1	Together	1	Together	Beautiful Scenery	186	9	0	_FP_psyk.B1	5d2fc58b7721ef4b059dac57c6528bad80bfa127
2132	'+0200	08-09-2015 21:49	Play	D1	Summer Rain	1	Sommerregn	Summer Rain	3618	0	0	_FP_psyk.D1	9ecf7a2f580551ee4e83a7d84f3d24a333e27169
2133	'+0200	08-09-2015 21:49	ListSelect	D1	Summer Rain	1	Sommerregn	Summer Rain	3618	19	0	_FP_psyk.D1	9ecf7a2f580551ee4e83a7d84f3d24a333e27169
2134	'+0200	08-09-2015 21:49	Play	D2	ECT 1	1	Quiet Please	StÃ¸vregn i grÃ¸n skov	900	0	0	_FP_psyk.D2	85028635659eda2c8b58c733972a7c0e7f3fdfce
2135	'+0200	08-09-2015 21:50	ListSelect	D2	ECT 1	1	Quiet Please	StÃ¸vregn i grÃ¸n skov	900	25	0	_FP_psyk.D2	85028635659eda2c8b58c733972a7c0e7f3fdfce
2136	'+0200	08-09-2015 21:50	Play	G1	Musicure	1	Niels Eje	Deep Woods & Village	788	0	0	_FP_psyk.G1	8d524ed89875145ae438a2bfaaf4876bb0cec3e6
2137	'+0200	08-09-2015 21:50	ListSelect	G1	Musicure	1	Niels Eje	Deep Woods & Village	788	8	0	_FP_psyk.G1	8d524ed89875145ae438a2bfaaf4876bb0cec3e6
2138	'+0200	08-09-2015 21:50	Play	G2	Resting Place	1	Fabrizio Paterlini	Colori	260	0	0	_FP_psyk.G2	d169a96fc5494e6c2821e1c4fbfa6026209b1d4a
2139	'+0200	08-09-2015 21:50	ListSelect	G2	Resting Place	1	Fabrizio Paterlini	Colori	260	3	0	_FP_psyk.G2	d169a96fc5494e6c2821e1c4fbfa6026209b1d4a
2140	'+0200	08-09-2015 21:50	Play	F2	Zen Spaces	1	-	Be Here Now	470	0	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2
2141	'+0200	08-09-2015 21:51	ListSelect	F2	Zen Spaces	1	-	Be Here Now	470	54	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2
2142	'+0200	08-09-2015 21:51	Play	F1	Quiet Please	1	Quiet Please	Transparant Moon on E	574	0	0	_FP_psyk.F1	00be1bf7037170c61bd5ee54254aef45bca958dd
2143	'+0200	08-09-2015 21:51	ListSelect	F1	Quiet Please	1	Quiet Please	Transparant Moon on E	574	1	0	_FP_psyk.F1	00be1bf7037170c61bd5ee54254aef45bca958dd
2144	'+0200	08-09-2015 21:51	Play	F2	Zen Spaces	1	-	Be Here Now	470	0	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2
2145	'+0200	08-09-2015 21:51	Skip	F2	Zen Spaces	1	-	Be Here Now	470	8	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2
2146	'+0200	08-09-2015 21:51	Play	F2	Zen Spaces	3	-	Inner Calling	541	431	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2
2147	'+0200	08-09-2015 21:51	Skip	F2	Zen Spaces	3	-	Inner Calling	541	462	0	_FP_psyk.F2	7bb263c54bf3cd166849909912c990f8ca6bbac2

iPad #04 56 Stue02 2015.12.15 e

Figure 3. Example of a log file print

Collaboration and interviews with patients and staff

Implementing 'The Music Star' in two ICUs can be very challenging, as the daily routines and potentially stressful workday of the staff sometimes call for quick decisions and actions. In such situations, the staff is inclined to rely on well-known procedures and actions. Changing routines and implementing new ones takes time, and in the early phases of the project some staff members had reservations towards 'The Music Star'. Our aim is to motivate the staff to actively use the app in their everyday routines alongside the interventions they know well, and therefore Lund and Bertelsen are still on a regular basis informing and teaching staff when and how to use the app. To further strengthen this work, a couple of key persons or 'superusers' from the staff were appointed at both wards, both to motivate the staff, to maintain an overview of the use and for technical support. The patients, on the other hand, more or less started using the app immediately.

Propagation of the systems

The initial 12 systems have now increased to a total of 41, since the psychiatric emergency unit received a system for each patient room (7), and AUH North received a similar set-up as AUH South (12+2). Moreover, in 2016 the Psychiatric Hospital in Tórshavn on the Faroe Islands has received a small number of systems (8). Further-

issn 1904-500X

more, numerous iPads with 'The Music Star' app is in use stand alone or in combination with other speakers (44) – all in all a total of 85 'Music Stars'.

'The Music Star' implemented in recently initiated studies
Right now 'The Music Star' is used in four research projects serving different functions:

- A feasibility study investigating the use of music as a constant in ECT treatment, the music accompainying the patient before, during and after the actual operational procedure. The study will look into reducing, for example, the anxiety of the patient, and improving the quality of the patient's experience of the treatment. The pilot study will also address technical solutions for connecting different sources of sound, as the treatment involves various locations during a process lasting approximately two hours in total. This ongoing study is conducted in collaboration with the medical department of the ECT, AudioCura and the Music Therapy Clinic at AUH.
- Further developing the 'Music in Ambulances' project by implementing 'The Music Star' in two ambulances, examining the influence of music in a variety of ambulance scenarios. In collaboration with the North Denmark Region, Falck, AudioCura and the Music Therapy Clinic at AUH.
- A three-year national research project on music therapy in the treatment of patients with schizophrenia, focussing on alleviating the negative symptoms of the illness. This project is a collaboration between the Music Therapy Clinic at AUH, the Centre for Schizophrenia at AUH, and music therapists and caregivers nationwide.
- A three year research project under the auspices of the Municipality of Aalborg, in treatment of citizens suffering from long term sick leave, the Music Star, among other initiatives, is used to facilitate a mental break and sleep support.

All four projects were launched in the Spring or Autumn of 2016.

Preliminary results

At this point in time it is not possible to report any solid results based on analyses of quantitative as well as qualitative data. The project is still in the data collection phase, and results of data analysis will be reported later this year. However, based on observations, personal reports and anecdotal data we can report that 'The Music Star' is used continuously and intentionally by staff and patients in the wards. For some patients, listening to music at specific times has become a part of their daily routine in the hospital. They soon found their personal favourite playlists, and some

issn 1904-500X

patients even complain when they are moved from a room with music to one without. The new equipment seems to be used primarily by those patients who already before submission to hospital used music listening as a coping strategy. They do not need guidance from nurses to start using 'The Music Star'. The nurses who have a personal interest in music are also those who are most likely to introduce the sound system and the idea of listening to music to the patients. Of course, both observations represent a challenge that must be dealt with and discussed when proper data are analysed. Overall, the response is positive from both patients and staff, though some patients complain about the repertoire of calm music, arguing that their favourite hard rock music is not included in the offer.

From a research methodological view, the log function of the 'The Music Star' offers new opportunities for data collection and analysis. So far it has only been possible to document the actual use of music pillows and MP3 players through self-reports, traditional interviews with patients and reports by staff. This made the documentation anecdotal. In principle, the new feature makes it possible to get exact data on patients' use of 'The Music Star'. Figure 3 shows a print excerpt of a patient log. These logs are very detailed, and we are still working on a method to filter the enormous amount of data in order to extract the important information. Data will allow us to get exact information on music selection, duration, volume (changes) and patterns of use (use during the day/night) etc.

The first planned articles will combine quantitative analyses of log files with qualitative analyses based on interviews and questionnaires.

Discussion

It is very important to clarify that the 'music intervention' concept draws on two distinctive fields: music medicine and music therapy (Bonde, 2015). These fields and clinical practice traditions are based on different paradigms: music medicine on a medical post-positivist stimulus-response model, and music therapy on a psychodynamic-humanistic interpersonal communication model. 'Music therapy in Medicine', as practised at the Music Therapy Clinic in Aalborg, aims to create a pragmatic framework also for music medicine initiatives like 'The Music Star'. Music medicine, music therapy and music milieu are all included in the general model of 'health musicking' mentioned in the introduction, but placed in separate quadrants of the model in Figure 1. The project described here can also be related to the recently developed human-centred approach to noise and sound milieus in hospitals (Johansson, Bergbom & Lindahl, 2012).

When looking at the increasing amount of studies by music psychologists, music therapists, neuropsychologists and neuroscientists on music intervention in healthcare and the effect of music listening on different populations (Gebauer & Vuust,

issn 1904-500X

2014), it is evident that the new music milieu project in psychiatry in Aalborg makes a contribution to an already existing field. The role of music in health perspectives is experiencing increasing attention these years (Ekholm, Juel & Bonde, 2015).

The Danish publication 'Music interventions in Healthcare' by Gebauer and Vuust (2014) is an example of this. This 'white book' presents an extensive number of research references from all over the world. However, the field of psychiatry is only represented by depression, insomnia and autism spectrum disorder as main themes. From our AUH psychiatric perspective this is rather peculiar, since these three titles or diagnoses simply do not cover the entire field. Besides, studies by music therapists are not included in the 'white book', which presents music medicine studies only. In spite of this, the publication and its list of references can be helpful as an introduction to the field of music intervention in healthcare from a neuroscientific perspective. The publication is a significant marker of the growing interest in music intervention among health professionals and researchers.

In 2005 Even Ruud, professor of musicology at Oslo University and of music therapy at the Norwegian Academy of Music, published the book *Lydlandskab* ('Soundscapes') opening a discussion on new listening cultures and the role of music in our society. A phenomenon named 'musical self-regulation' was introduced. A number of empirical studies by researchers such as DeNora (2000) mapping music listening practices in everyday life and Saarikallio (Carlson et al., 2015) studying affect regulation through music listening document how music listening is used to regulate mood and to reduce stress and anxiety. The study of music and public health by Ekholm, Bonde and Juel (2015) documents that half of the adult Danish population use music to regulate their mood and energy. These studies all support the ideas driving the development of the new sound and music milieu in psychiatry in Aalborg.

The music milieu project described in this article is inventive with regard to its particular aim to develop and design music equipment and playlists to suit the special needs and challenges in psychiatry and in intensive care in particular. In the process of developing the equipment in interdisciplinary groups including music therapists (with many years of ICU experience), health professionals from the hospital and the private company AudioCura specialising in developing music equipment for hospitals and ambulances, the aim has been to develop sound systems which can be used both by patients and staff, and which are adjusted to daily clinical practice in the units. To our knowledge, this has not been done before. As mentioned in the literature review, it can be argued that more personalised playlists may be more beneficial than a standardised system like 'The Music Star'. However, this new initiative must be studied in its own right, before comparative studies are designed.

At present the log function of 'The Music Star' cannot be linked to physiological parameters such as heart rate or galvanic skin response. This would of course

issn 1904-500X

be a great scenario for future psychophysiological research into the effect of music intervention on, for example, sleep quality, brain waves or ANS responses. At a more general level, differences in patient needs and soundscapes in psychiatric and somatic hospitals need to be addressed. The present project has developed organically within the framework of hospital psychiatry; however, noise levels and soundscapes can be very different in somatic areas such as ICUs. A study by Mackrill, Cane & Jennings (2013) makes it clear that sound level is just one aspect of a hospital soundscape. Negative soundscapes can have other origins, and coping with that may not only be a question of masking it with music. A combination of 'The Music Star' log function and physiological measures may be the key to developing 'healthy soundscapes' also in somatic hospitals.

This project facilitates a unique option of connecting clinical experience and experimental research in a developmental process. A dialogue between clinicians and researchers within the hospital setting takes place on a daily basis. Furthermore, this investigation fosters novel and genuine technology development within sound equipment and environment in the healthcare sector. The primarily clinical evidence from the field of psychiatry is complemented by a number of research studies from somatic fields, indicating that a 'sound milieu' is a common goal in all hospitals.

However, implementing new practices in acute units is a challenging task. Hospital ICUs are busy work places with a broad spectrum of patient-related job tasks. Nurses help patients with self-management strategies during the day by offering talks, a walk, a cigarette, physical activity, a bath, medication, a 'kugledyne' (a heavy duvet with plastic balls instead of feathers) and music listening, to mention a few.

Ethical questions arise and need to be discussed further, based on the premise that 'You can close your eyes, but not your ears'. This discussion must consider the following questions: Is music played for the patient during restraint (including use of a fixation belt) beneficial to the patient? How and when is the music introduced to the patient? What are the implications and challenges in offering music listening in situations with coercion?

Conclusion

Based on a number of pilot studies in AUH-Psychiatry investigating how special playlists and sound equipment can be used by hospital patients and administered by hospital staff supervised by music therapists, the project 'A New Sound and Music Milieu at Aalborg University Hospital' aims to prepare the ground for the systematic application of sound and music in the hospital environment.

Technical and practical challenges have been identified and work is progressing to solve specific problems in three main areas: 1) the music equipment, 2) the music

issn 1904-500X

and the playlists, and 3) the log files and the research. The need for safety and the demands of the psychiatric patient will be evaluated and reconsidered. The upcoming research findings will result in changes in the general design and, of course, in new questions. All the present challenges and lack of proper documentation notwithstanding, the authors believe that the new sound and music interventions have come to stay.

A strong basis in the patient perspective and an eclectic approach to treatment is characteristic for music therapists – clinicians and researchers – trained at Aalborg University. Perhaps this orientation can be a key to success for the new sound and music intervention project at Aalborg University Hospital – also in the somatic area. The project described in this article is situated in a time and culture where patient-centred approaches are increasingly focussing on new treatment strategies, nationally and throughout Europe. Patients ask for alternatives to medical treatment during hospitalisation, and this initiative contributes to the field of future non-medical interventions in psychiatry.

References

Bonde, L.O. (2009). Preferences and protocols: Comments on Short & Ahern's article "Evaluation of a systematic development process: Relaxing music for the emergency department". Australian Journal of Music Therapy, 20.

Bonde, L.O. (2011). Health music(k)ing – Music therapy or Music and health? A model, empirical examples and personal reflections. Music and Arts in Action, 3(2, special issue: Health promotion and wellness), 120-140.

Bonde, L.O. (2015). Music and Medicine and Music Therapy in Hospitals: An overview of practices and evidence. European Journal of Integrative Medicine, 7(sup 1). 10.1016/j.eujim.2015.09.012

Bonde, L.O., Hannibal, N., & Pedersen, I.N. (2012). Musikterapi i psykiatrien i Danmark: Klinisk praksis, forskning og formidling. En statusrapport. Musikterapi i psykiatrien online (MIPO) 7(1).

Bradt, J., Dileo, C., & Shim, M. (2013). Music interventions for preoperative anxiety. The Cochrane Library. DOI: 10.1002/14651858.CD006908.pub2

Braun, V. & Clark, V. (2006). Using Thematic Analysis in Psychology. Qualitative Research in Psychology, (3): 77-101.

Carlson, E., Saarikallio, S., Toiviainen, P., Bogert, B., Kliuchko, M., & Brattico, E. (2015). Maladaptive and adaptive emotion regulation through music: a behavioral and neuroimaging study of males and females. Frontiers in Human Neuroscience, 9, 466. Doi: 10.3389/fnhum.2015.00466

Chan, M.F., Wong, Z.Y., & Thayala, N. (2011). The effectiveness of music listening in reducing depressive symptoms in adults: a systematic review. Complementary Therapies in Medicine, 19, 332-348.

Chanda, L., & Levitin D.J. (2013). The Neurochemistry of Music. Trends in Cognitive Sciences, 17(4), 179-194.

Clarke, E., DeNora, T., & Vuoskoski, J. (2015). Music, empathy and cultural understanding. Physics of Life (Reviews), 1 September 2015.

DeNora, T. (2000). Music in Everyday Life. Cambridge: Cambridge University Press.

Dileo, C., & Bradt, J. (2005). Medical Music Therapy: A Meta-analysis & Agenda for Future Research. Cherry Hill, NJ: Jeffrey Books.

issn 1904-500X

Egelund, T.E. (2005). Behandling af angste psykiatriske patienter med MusiCure – et pilotprojekt. Musikterapi i psykiatrien, 4, 76-83

Ekholm, O., Juel, K. & Bonde, L.O. (2015). Music and Public Health – An empirical study of the use of music in the daily life of the adult Danish citizens and the health implications of musical participation. Arts & Health, 7. 10.1080/17533015.2015.1048696

Gebauer, L., & Vuust, P. (2014). Music interventions in health care. Kgs. Lyngby: Danish sound innovation network.

Grocke, D., & Wigram, T. (2007). Receptive Methods in Music Therapy. London: Jessica Kingsley Publishers.

Hannibal, N., Bonde, L.O., & Lund, H.N. (2013). Musiklyttepuder, lydbøjler og spillelister i behandlingen af psykiatriske patienter: Personaleerfaringer med at anvende musiklyttepuder til forskellige grupper af patienter i psykiatrien i Aalborg. Musikterapi i psykiatrien online (MIPO) 8(2), 4-13.

Hanser, S.B., & Mandel, S.E. (2010). Manage Your Stress and Pain Through Music. Boston: Berklee Press.

Hole, J., Hirsch, M., Ball, E., & Meads, C. (2015). Music as an aid for postoperative recovery in adults: a systematic review and meta-analysis. The Lancet. http://dx.doi.org/10.1016/S0140-6736(15)60169-6

Jespersen, K.V., Koenig, J.L., Jennum, P., & Vuust, P. (2015). Music for insomnia in adults. Cochrane Database of Systematic Reviews 2015, 8. CD010459. DOI 10.1002/14651858.Cd010459.pub2.

Johansson, L., Bergbom, I., & Lindahl, B. (2012). Meanings of being critically ill in a sound-intensive ICU patient room-A phenomenological hermeneutical study. The Open Nursing Journal, 6, 108. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3439833/pdf/TONURSJ-6-108.pdf

Lund, H.N. (2008). Musiklyttegrupper i voksenpsykiatrien. Musikterapi i psykiatrien, 5, 123-132.

Lund, H.N. (2011). Musikterapi med musiklyttepude på lukket akut modtageafsnit. Dansk Musikterapi, 8(1), 28-29.

Lund, H.N., & Fønsbo, C.D. (2011). Musiklyttegrupper – en empirisk undersøgelse af anvendte metoder i psykiatrien. Musikterapi i psykiatrien, 6, 86-101.

Lund, H.N., & Bertelsen, L.R. (2015). Music listening as anxiety management in intensive psychiatry. Callaghan, P., Oud, N., Bjørngaard, J.H., Nijman, H., Palmstierna, T., & Duxbury, J. (Eds). Proceedings of the 9th European Congress on Violence in Clinical Psychiatry, p. 177. Amsterdam: Kavanagh.

Lund, H.N., & Bertelsen, L.R. (2016). "Musikstjernen" – en ny stjerne i psykiatrien. Dansk Musikterapi, 13(1), 3-10.

Mackrill, J., Cain, R., & Jennings, P. (2013). Experiencing the hospital ward soundscape: Towards a model. Journal of Environmental Psychology, 36(December 2013), 1-8.

Miell, D., MacDonald, R., & Hargreaves, D.J. (2005). Musical Communication. Oxford: Oxford University Press.

Nilsson, U. (2008). The anxiety and pain reducing effect of music interventions in perioperative care; a systematic review. AORN Journal, 87(4), 780-807.

Ruud, E. (2005). Lydlandskap. Oslo: Fagbokforlaget.

Schou, K. (2007). Musikmedicin og musikterapi i medicin. Psyke & logos, 28(1), 525-547.

Schou, K., & Bonde, L.O. (2012). Forskning i musikintervention: Smertebehandling i forbindelse med operation. Dansk Musikterapi, 9(1), 34-43.

Schou, K., Bonde, L.O., & Pedersen, I.N. (2011). Musiklytning til patienter i skærmning: Pilotprojekt. Musikterapi i psykiatrien, 6.

Short, A., & Ahern, N. (2009). Evaluation of a systematic development process: Relaxing music for the emergency department. Australian Journal of Music Therapy, 20, 3-26.

Stige, B. (2003). Elaborations toward a notion of community music therapy. Oslo: Unipub.

issn 1904-500X

Thorgaard, P., Ertmann, E., Hansen, V., Noerregaard, A., Hansen, V., & Spanggard, L. (2005). Designed sound and music environment in postanaesthesia care units – a multicentre study of patients and staff. Intensive and Critical Care Nursing, 21(4), 220-225.

Wärja, M., & Bonde, L.O. (2014). Music as Co-Therapist: Towards a Taxonomy of Music in Therapeutic Music and Imagery Work. Music and Medicine, 6(2), 16-27.

Link to paper on line array technology: http://www.aes.org/e-lib/browse.cfm?elib=13220-&rndx=445722

Link to a film on AUH music listening projects, 'The Music Star' and music in ambulances (4 min.): https://www.youtube.com/watch?v=iAoUhItwoUo

issn 1904-500X